

#047
70532

29 AUG 70 25 42

PRIORITY

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1. NUMERICAL SUMMARY:

1111-2, 30 JUL - 10 AUG 70, REC 10 AUG 70/2128Z

LAUNCH DATE & TIME: 23 JUL 70/0125Z

VEHICLE NO: 1654

CAM SYS: CR-12

PAN CAMS: AFT LOOKING 324, FILM TYPE 3414

FWD LOOKING 325, FILM TYPE 3414

DISIC UNIT: 2R

STELLAR LENS: PORT F/2.8 1.5 SEC NO FILTER

STB F/2.8 1.5 SEC NO FILTER

FILM TYPE: 3401

TERRAIN LENS: F/6.3 1/500 SEC (FIXED) W-12 FILTER

FILM TYPE: 3400

REC REVS: MSN 1111-1, REV 112

MSN 1111-2, REV 301

LAUNCH WINDOW: 0125Z TO 0145Z, 23 JUL 70

2. CAM SETTING:

FWD LOOKING: W-25 GELATIN (PRIM)

W-25 GLASS-7 MILS (ALT)

SLIT WIDTH POS 1 - 0.131

POS 2 - 0.176

POS 3 - 0.234

POS 4 - 0.287

FAIL SAFE-0.189

AFT LOOKING: W-21 GELATIN (PRIM)

W-21 GLASS - 7 MILS (ALT)

SLIT WIDTH POS 1 - 0.080

POS 2 - 0.110

POS 3 - 0.155

POS 4 - 0.195

FAIL SAFE - 0.135

3. PERFORMANCE SUMMARY:

U.S. PERFORMANCE SUMMARY.
A. [] REPORTED PI SUITABILITY FOR MSN 1111 RANGED FROM GOOD TEXT TO POOR WITH LARGE PORTION IN GOOD TO FAIR CATEGORY. [] STATED THAT IMAGE QUALITY VARIABILITY IS ATTRIBUTABLE TO VARIATION IN ACQUISITION ALT (88NM TO 147NM) AND ADVERSE WEATHER CONDITIONS (CLOUD COVER APPROX 30 PCT). PET TEAM CONCURS WITH [] COMMENTS AND NOTED THAT MSN 1111, EXCEPT FOR WEATHER AND ALTITUDE VARIATIONS, PRODUCED THE MOST CONSISTENTLY CRISP IMAGEY OF ANY CORONA SYSTEM FLOWN. THE 3414 FILM APPEARS TO HAVE ENHANCED MSN PERFORMANCE THROUGH REDUCTION OF EXPOSURE TIME AND MEAN CAMERA SMEAR. IMAGERY ACQUIRED DURING CLEAR WEATHER CONDITIONS HOLDS TOGETHER WELL AT 100X MAG. THE MIP'S OF 105 WHICH WERE ASSIGNED MSNS 1111-1 AND 1111-2 WERE CONSIDERED EXTREMELY GOOD FOR THE ACQUISITION ALT. ALTHOUGH BOTH MIP FRS WERE OBTAINED WITH FWD CAM, THE PET NOTED THAT THE VARIABILITY OF THE FWD IMAGERY IS GREATER THAN THE AFT. [] COMPARISON OF CAM SYS RES, BASED ON CORN TGT ANALYSIS, SHOWED MSN 1111 EQUAL TO OR SUPERIOR IN ACHIEVED-ON-ORBIT RES TO MSNS 1104 AND 1106. THESE ARE THE ONLY TWO MSNS WHICH ACHIEVED HIGHER MIP'S. THE MEAN ON-ORBIT RES OF BOTH FWD AND AFT CAMS IS ESTIMATED TO BE NEAR THE PEAK LEVEL OF SYS (CR-12) CAPABILITY (120-160C/MM) AT 2:1 CONTRAST.

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TOP SECRET

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B. MSN 1111 [REDACTED] COMPUTER EVALUATIONS WERE CONDUCTED PRE-MSN AND RESULTS SUPPLIED TO COMIREX AND SOC. AS PART OF PET ACTIVITIES A CORRELATION WAS MADE OF [REDACTED] PREDICTIONS FOR CORN TARGETS ON MSN 1111-1 AND READINGS SUPPLIED BY [REDACTED] AND PET TEAM MEMBERS. RESULTS ARE AS FOLLOWS:

PASS TGT CAM SCAN VEM CRYSPER-C TGT RES

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C. THE PET RECOMMENDS A COMPLETE ANALYSIS OF [REDACTED] PREDICTIONS VERSUS PI SUITABILITY RATINGS BE MADE FOR MSN 1111 MISSILE TGT. IT IS SUGGESTED [REDACTED] COORDINATE ANALYSIS. BASED ON [REDACTED] DATA, THE PET FEELS A STATISTICAL CORRELATION CAN BE SHOWN BETWEEN PREDICTED RES AND PI SUITABILITY.

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D. NOTE HAS ALREADY BEEN MADE OF EXCELLENT FOCUS OF CAM SYS THROUGHOUT MSN. THE PET ATTRIBUTES THIS TO DECISION MADE BY 1110 PET TO FOCUS CAMS FOR MSN 1111, BASED ON EXPECTED ON-ORBIT TEMP OF 60-65 DEG INSTEAD OF 70 DEG USED FOR PREVIOUS MSNS. THE PET RECOMMENDS THIS PROCEDURE BE CONTINUED ON FUTURE SYSTEMS.

E. AN INFLIGHT FOCUS ADJUST CAPABILITY WAS INTRODUCED ON MSN 1111. WITH 0.004 INCH THICK GELATIN FILTERS IN PRIMARY POSITION AND 0.007 INCH THICK GLASS FILTERS IN ALT POSITION, A FILTER CHANGE DURING OPERATION EFFECTED A NOMINAL 0.001 INCH FOCAL SHIFT. IMAGERY FROM MSN 1111-1, PARTICULARLY PASS D063, WAS USED TO COMPARE IMAGE QUALITY RESULTING FROM EACH FILTER. THE COMPARATIVE EVAL WAS BASIS OF DECISION FOR CAM FOCUS ON MSN 1111-2, AND SHOWED THAT A 0.001 INCH NOMINAL FOCAL SHIFT IS DETECTABLE IN IMAGERY. THE DIFFERENCE IN FOCAL POSITION IS MORE EVIDENT IN FWD CAM IMAGERY THAN AFT.

VISUAL EDGE MATCHING (VEM) WAS USED AS PART OF MID-MSN EVAL AND THIS DATA SUBSTANTIATED SUBJECTIVE EVAL. RES IN IMC DIRECTION IS CONSISTENTLY SUPERIOR TO THAT IN SCAN DIRECTION ON THE 12 FRS EVALUATED WITH VEM. THE HIGHEST RES READ (AN AVERAGE OF 4 READERS) WAS 143 C/MM, OBTAINED FROM AFT LOOKING CAM/GELATIN FILTER COMBINATION. BY AVERAGING VEM DATA FROM ALL FRS, COMPARATIVE PERFORMANCE OF PASS D063 IS CHARACTERIZED BY IMC/SCAN RES AS FOLLOWS:

CAM	GELATIN FILTER (IN FOCUS)	GLASS FILTER (DE FOCUS)
FWD (W-25)	120/89C/MM	114/52C/MM
AFT (W-21)	126/99C/MM	95/80C/MM

BASED ON FILTER STUDY FROM MSN 1111, THE PET RECOMMENDS THAT W-25 AND 21 SPECTRAL COATINGS ON 0.007 INCH GLASS SUBSTRATE FILTER BE INSTALLED IN ALT POSITIONS OF CR-13 FOR USE DURING MSN 1112. THROUGH FOCUS RES TESTS WILL BE CONDUCTED WITH BOTH GELATIN AND GLASS FILTERS ON PHOTO OPTICAL SIMULATOR BEFORE MISSION.

4. PAN CAM ANOMALIES:

A. ANOMALY: RANDOM, INTERMITTENT, PLUS DENSITY SPOTS ARE PRESENT ON ALL MAIN CAM MATERIALS BEGINNING WITH PASS A113 AND CONTINUING THROUGH BALANCE OF MSN. SIZE OF SPOTS VARIES WITH LARGEST

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APPROX FIVE THOUSANDTHS INCH. THESE SPOTS ARE SIMILAR TO THOSE NOTED ON MSN 1110-2 AND GENERALLY APPEAR IN TWO GROUPINGS ON LAST EIGHT INCHES OF SUPPLY END OF FR. THESE SPOTS ARE HEAVILY CLUSTERED TOGETHER IN PATTERN ON PASS A113 FWD AND AFT AND APPEAR AS ABRASION MARKS OR SMUDGES TO UNAIDED EYE. THIS PATTERN BEGINS AT SUPPLY END AND CONTINUES APPROX NINE INCHES INTO EACH FR OF PASS A113. THE PATTERN APPEARS AS TWO PARALLEL, LONGITUDINAL MARKINGS WITHIN FORMAT ULTIMATELY CONVERGING TOWARD CENTER OF FR WITHIN LAST THREE INCHES. THE PATTERN ON FWD RECORD CONTINUES INTO PASS D115 WITH DECREASING SEVERITY AT END OF PASS.

CAUSE: FOLLOWING MSN 1110 AND 1111. SERIES OF INDEPENDENT INVESTIGATIONS WAS PERFORMED BY [REDACTED] UTILIZING AVAILABLE MSN DUPE POS AND TEST-GENERATED ORIG NEGS. THE FOLLOWING OBSERVATIONS HAVE BEEN MADE:

1. THE SPOTS OCCUR WITH GREATER FREQUENCY ON SUPPLY SIDE OF FORMAT. HOWEVER, THEY HAVE BEEN OBSERVED RANDOMLY THROUGHOUT ENTIRE ACTIVE FORMAT.
2. OCCASIONALLY, A NEG DENSITY CENTER NUCLEUS IS EXHIBITED IN THE SPOT ON THE ORIG NEG.
3. OCCASIONALLY, A ROW OF PEARL-LIKE SPOTS WERE OBSERVED.
4. FREQUENCY OF SPOT OCCURRENCE APPEARS GREATER ON ALTERNATE FRs.
5. SPOTS DO NOT OCCUR IN UNEXPOSED RAIL AREAS, BUT APPEAR RESTRICTED TO A 1.75 INCH WIDE BAND IN CENTER OF ACTIVE FORMAT. HOWEVER, THE SPOTS DO EXTEND INTO UNEXPOSED INTERFRAME AREA BETWEEN MAIN FORMAT AND A. O. EXPOSED AREA AND ALSO APPEAR IN A. O. FORMAT.
6. SIZE OF SPOTS RANGES FROM .0005 INCH TO .005 INCH.
7. SPOTS HAVE BEEN OBSERVED ON 3404 AND 3414 AND ONLY ON MATERIAL WHICH RECEIVED DUAL GAMMA PROCESSING.
8. IN 1110 AND 1111 SPOT APPEARANCE HAS BEEN RESTRICTED TO "B" PORTION OF FLIGHT MATERIAL. HOWEVER, IN 1111 SPOTS OCCURED EARLIER AND ARE MORE EXTENSIVE THAN IN 1110.
9. SPOTS HAVE NOT BEEN OBSERVED IN HIVOS TEST RUNS.
10. SPOTS WERE NOT CONSIDERED OBJECTIONABLE BY PI'S ON MSN 1110 BUT ARE OBJECTIONABLE ON MSN 1111.
11. THERE IS A SIGNIFICANT REDUCTION IN OCCURRENCE OF SPOTS ON NEXT TO LAST FR OF EACH PASS.

ACTION: THE PET RECOMMENDS THIS ITEM REMAIN OPEN AND AN INVESTIGATION BE CONDUCTED TO DETERMINE POSSIBLE CAUSE. FOLLOWING ACTION IS RECOMMENDED:

1. INVESTIGATE 3414 MATERIAL FROM OTHER SYSTEMS ON A CURRENT BASIS FOR OCCURRENCE OF SIMILAR ANOMALY.
2. REVIEW ALL MATERIAL FROM MSNS 1110 AND 1111 TO SUBSTANTIATE PRELIMINARY OBSERVATIONS AND POSSIBLY PROVIDE CORRELATION WITH OPERATIONAL PARAMETERS.
3. DETERMINE FEASIBILITY OF INVESTIGATING FLIGHT PAYLOAD FROM MSNS OTHER THAN 1110 AND 1111.
4. PROVIDE A REPRESENTATIVE PORTION OF MATERIAL FROM NEXT HIVOS FOR DUAL GAMMA PROCESS. [REDACTED] WILL CONVEENE AT CLOSE OF PET MEETING TO OUTLINE SPECIFIC STEPS TO SATISFY ABOVE REQUIREMENTS.

B. ANOMALY: FRs 16 THRU 24 OF PASS D242 CONTAIN VERY FINE PLUS DENSITY MARKINGS. THESE MARKINGS BEGIN AS FINE, LONGITUDINAL RAKE MARKS CONFINED TO BINARY BORDER AREA AND PROGRESS TO A MORE PREDOMINANT HIGH FREQUENCY SQUIGGLE (RASTER-LIKE) MARK BY FR 21. ON FRs 23 THRU 24 THIS SQUIGGLE EFFECT MAINTAINS APPROX 0.5MM AMPLITUDE WITH AN ESTIMATED 200 CYCLES OVER A 2.00MM DISTANCE. THESE SQUIGGLES ARE ORIENTED PARALLEL TO MAJOR AXIS OF FILM. ON FRs 23 AND 24 THE SQUIGGLE PATTERNS OVERLAP AND APPEAR AS CHECKER-

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BOARD PATTERNS TO UNAIDED EYE. THESE PATTERNS ARE GENERALLY CONFINED TO BOTH BORDERS, HOWEVER, THEY ALSO OCCUR WITHIN FORMAT. DEGRADATION TO IMAGERY IS MINOR.

CAUSE: NOTHING ASSOCIATED WITH CAM SYS OF FILM HANDLING CAN BE IDENTIFIED AS CAUSE AT THIS TIME.

ACTION: THE ENTIRE SYS WILL BE REVIEWED IN DETAIL TO ESTABLISH ANY RELATIONSHIP OR CAUSE OF ANOMALY. ASSIGNED TO [REDACTED]

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C. ANOMALY: A VERY DENSE FOG PATTERNS IS PRESENT ON THIRD AND FOURTH FRs FROM END OF ALL CAM OPS. FOG ON THIRD FR FROM END IS APPROX FOUR INCHES IN LENGTH AND COVERS WIDTH OF FORMAT. FOG ON FOURTH FR FROM END PROTRUDES ONE INCH INTO FORMAT FROM BINARY EDGE AND IS APPROX TWO INCHES IN LENGTH. THESE FOG PATTERNS OBSCURE IMAGERY.

CAUSE: ORIENTATION OF FOG MARKS INDICATE THAT THE PRINCIPLE FOG MARK ON THIRD FR WAS CAUSED BY LIGHT COMING FROM FWD SIDE OF FWD LOOKING CAM DRUM/BOOT AREA BELOW FILM. FOG MARK ON FOURTH FR IS BELIEVED TO BE A REFLECTION, WITHIN SPACE STRUCTURE, FROM LIGHT LEAK.

ACTION: A REVIEW OF LIGHT LEAK PROCEDURES IS RECOMMENDED TO DETERMINE THOROUGHNESS OF PHOTOMULTIPLIER SEARCH FOR EVALUATING LIGHT LEAKS IN THE BOOT SEAL AREAS. ASSIGNED TO [REDACTED]

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D. ANOMALY: A FOG PATTERN IS PRESNET NEAR SUPPLY END OF THIRD FR OF EACH CAM OP. THIS PATTERN EXTENDS APPROX ONE HALF INCH FROM BINARY FILM EDGE INTO FORMAT AND CAUSES MINOR DEGRADATION TO IMAGERY.

CAUSE: FOG MARK APPEARS TO BE CAUSED BY LIGHT LEAK IN DRUM AREA OF FWD LOOKING CAM.

ACTION: SEE PARA 4C.

E. ANOMALY: SEVERAL MINOR, LONGITUDINAL PLUS DENSITY LINES ARE PRESENT INTERMITTENTLY THROUGH FWD RECORD. THESE LINES CONTINUE THROUGH HORIZON FORMAT.

CAUSE: MARKINGS APPEAR TO BE RESULT OF ABRASIONS BETWEEN FILM AND A TRANSPORT COMPONENT. FINE SCRATCHING WAS INDUCED DURING AMBIENT OPERATION WITH FLIGHT MATERIAL. ANOMALY REPORTED IN FLIGHT APPEARS ASSOCIATED WITH THESE SCRATCHES. EXTENT OF INVESTIGATION AFTER PRE-FLIGHT LOADING WAS RESTRICTED BY SYS CONFIG AND SCHEDULE.

ACTION: NO ACTION REQUIRED.

F.

F. ANOMALY: SLIGHT VARIATION IN IMAGE QUALITY EXISTS ACROSS FORMAT WITH BETTER QUALITY RECORDED ALONG CAM NUMBER EDGE ON AFT MATERIAL AND BINARY EDGE OF FWD MATERIAL.

CAUSE: PRE-FLIGHT AGT FILM LIFT MEASUREMENTS NORMALLY SHOW FILM PLANE VARIATIONS ACROSS WEB. A MINOR DEGREE OF IMAGE PLANE TILT AND LENS FIELD CURVATURE ALSO EXISTS. THESE VARIATIONS ARE EXPECTED TO SHOW MINOR IMAGE QUALITY CHANGES ACROSS FR.

ACTION: NO ACTION IS RECOMMENDED.

G. ANOMALY: VERY DENSE FOG PATTERN IS PRESENT NEAR SUPPLY END OF LAST FR OF EACH CAM OP ON PASSES M69 TO D86 AND D148 TO D298 (END OF MSN). THE FOG PATTERN IN APPROX SIX INCHES IN LENGTH AND COVERS WIDTH OF FILM WEB.

CAUSE: LENS STOWING IN ACTIVE FORMAT WITH CAPPING SHUTTER OPEN. THIS ANOMALY WAS RESULT OF UNIDENTIFIED MALFUNCTION OF STOW SWITCH. AS INSTRUMENT OPERATED IN CREEP MODE, THE CENTER OF FORMAT SWITCH OPERATED NORMALLY, OPENING LATCHING RELAY AND PROVIDING POWER ONLY THROUGH STOW SWITCH. IF AT THIS TIME THE STOW SWITCH FAILS, THE LENS WILL STOP SOMEWHERE IN VICINITY OF CENTER FORMAT.

ACTION: NO ACTION RECOMMENDED.

H. ANOMALY: AFTER PASS D214 THE BINARY WORD IS IMAGED PROPERLY

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EXCEPT ON SECOND FR FROM END OF EACH CAM OP. THIS TIME WORD IS MODERATELY BLOOMED AND ALL BINARY BITS ARE IMAGED.

CAUSE: ANOMALY IS CHARACTERISTIC OF PREVIOUSLY REPORTED MULTIPLE SLIPS AND/OR SERIAL NUMBER PRINT-OUTS AT SHUTDOWN. HOWEVER, DUE TO STOW SWITCH PROBLEM. WHICH RESTRICTED PROPER STOWING OF LENS AND ADDITIONAL TRANSPORT OF MATERIAL PAST FINAL FR, THESE MULTIPLE PRINT-OUTS WERE SUPERIMPOSES. THE ONLY FR AFFECTED IS CREEP FR WHICH IS OF LIMITED VALUE.

ACTION: NO ACTION REQUIRED.

I. ANOMALY: A MINOR, LONGITUDINAL MINUS DENSITY STREAK IS PRESENT ALONG THE CENTER OF FRs 1-17 OF PASS A113 FWD. THIS STREAK IS APPROX 1/4 TO 1/3 INCH WIDE.

CAUSE: POSITION AND WIDTH OF MARKING CORRELATE WITH PUCK ARM IN TAKE-UP.

ACTION: NO ACTION REQUIRED.

5. DISIC CAMERA PERFORMANCE: LAST ACQUISITION OBTAINED FROM INDEX CAM IS FR 19 PASS 298. POINT-TYPE STAR IMAGES WERE RECORDED BY BOTH STELLAR CAMS. APPROX 20-30 STAR IMAGES RECORDED ON PORT FORMATS. APPROX 0-20 STAR IMAGES RECORDED ON STB FORMATS. INDEX IMAGE QUALITY, WHERE NOT DEGRADED BY STATIC FOGGING, IS GOOD AND COMPARABLE WITH BEST DISIC IMAGE QUALITY OBTAINED ON MSN 1109.

6. DISIC ANOMALIES:
A. ANOMALY: DENDRITIC AND CORONA STATIC TRACES ARE PRESENT INTERMITTENTLY THROUGHOUT STELLAR RECORD. DEGRADATION IS MINOR.

CAUSE: OVERALL STATIC LEVEL AMONG LOWEST OBSERVED IN DISIC TO DATE. DISCHARGES FROM FILM EDGE ARE CHARACTERISTIC OF UNSPOOLING OR ROLLER FLANGE DISCHARGE. THESE MARKS ARE CHARACTERISTIC OF SYSTEM IN SOME SENSITIVE PRESSURE WINDOWS. SOME CORRELATION BETWEEN MARKING AND PMU OFF PERIODS NOTED.

ACTION: NO ACTION REQUIRED.

B. ANOMALY: A SERIES OF CONTINUOUS PLUS DENSITY LINES ARE CONCENTRATED IN A 0.8 INCH WIDE BAND, 1.5 INCHES FROM NON-BINARY FILM EDGE. SOME DEGRADATION APPARENT; HOWEVER, PRACTICALLY ALL IMAGERY IS GOOD. THIS PATTERN RESEMBLES THAT EXHIBITED ON MSN 1110-1, BUT LESS SEVERE. MARKING FIRST APPEARED IN PRE-FLIGHT TEST OPERATIONS RECOVERED WITH FLIGHT FILM.

CAUSE: FLIGHT RESULTS AND AP GROUND TESTS INDICATE THAT FILM REMAINED IN CONTACT WITH GRID PLATE DURING FILM TRANSPORT. INITIAL INVESTIGATIONS INDICATE MOST LIKELY SOURCES ARE INCORRECT LOCATION OF INDEX FILM ROLLER/ROLLERS IMMEDIATELY ADJACENT TO PLATEN AND/OR ANOMALOUS STATIC CHARGE CHARACTERISTIC OF GRID PLATES.

ACTION: [REDACTED] WILL UNDERTAKE IMMEDIATE QUANTITATIVE ANALYSIS OF PROBLEM. SPECIFICALLY: (1) MEASUREMENTS WILL BE MADE TO DETERMINE PROPER ALIGNMENT AND DISTANCES OF INDEX FILM ROLLERS TO INDEX FOCAL PLANE PLATES ON REMAINING DISIC UNITS (S/N 8, 13, 14 AND 1R). (2) HISTORY OF MFG OF GRID PLATES IS UNDER INVESTIGATION TO DETERMINE IF ANY PROCESS CHANGES/ANOMALIES CORRELATE WITH MARKING PROBLEM. (3) OPERATIONAL PROCEDURES OR HARDWARE CHANGES MADE BETWEEN 1109 AND 1110 WHICH MAY AFFECT SYSTEM MARKING WILL BE INVESTIGATED. CORRECTIVE ACTION WILL BE MADE AS CAUSES AND SOLUTIONS ARE FOUND.

D. ANOMALY: AN IMAGE OF AN EYELASH IS PRESENT ON EVERY PORT FRAME OF MSN 1111-2 AFTER PASS 100, RESULTING IN SOME LOCAL OUT OF FLAT CONDITION IN VICINITY OF EYELASH.

CAUSE: EYELASH DISLODGED AND WAS CARRIED TO FOCAL PLANE.

ACTION: CONTINUING ATTENTION TO CLEANLINESS DURING DISIC FLIGHT PREPS. ASSIGNED TO [REDACTED]

7. ACTION ITEMS FROM MSN 1110 WERE DISCUSSED. FOUR CLOSED AND THREE STILL UNDER INVESTIGATION. THE OPEN ITEMS ARE:

AC 1110-1, MINUS DENSITY SPOTS ON AFT LOOKING FILM.

AC 1110-3, PLUS DENSITY SPOTS ON FILM OF BOTH PAN CAMERAS.

AC 1110-6, PLUS DENSITY LINES ON DISIC TERRAIN FILM.

T O P S E C R E T

GP-1

END OF MESSAGE

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